

## A TAXONOMIC REVISION OF THE *CAMPONOTUS MACROCEPHALUS* SPECIES GROUP (HYMENOPTERA: FORMICIDAE) IN AUSTRALIA

by A. J. McARTHUR\* & S. O. SHATTUCK†

### Summary

McARTHUR, A. J. & SHATTUCK, S. O. (2001) A taxonomic revision of the *Camponotus macrocephalus* species group (Hymenoptera: Formicidae) in Australia. *Trans. R. Soc. S. Aust.* **125**(1), 25-43, 31 May, 2001.

Australian ants in the *Camponotus macrocephalus* species group are reviewed. The group is defined here for the first time and contains eleven species including three new and one raised from subspecific to specific rank. In addition, five new synonyms are proposed. The species placed in this group are: *C. anderseni* sp. nov., *C. umetteae* sp. nov., *C. conithorax* Emery, *C. howensis* Wheeler, *C. gasseri* (Forel), *C. janeti* Forel, *C. janforrestiae* sp. nov., *C. mackayensis* Forel (previously a subspecies of *C. reticulatus*), *C. macrocephalus* (Erichson), *C. sanguifrons* Viehmeyer and *C. vitreus* (Smith). The new synonyms are: *C. gasseri coloratus* Wheeler, *C. gasseri lysias* Forel and *C. gasseri obrusitrimcatus* Forel with *C. gasseri*, and *C. ficator angustulus* Viehmeyer and *C. semicarinatus* Forel with *C. macrocephalus*. The queens and major workers of these species display varying degrees of phragmosis from weak to very strong and the worker caste is dimorphic. Most are arboreal nesters.

KEY WORDS: Hymenoptera, Formicidae, Formicinae, *Camponotus*, arboreal ants, phragmosis.

### Introduction

Species in the genus *Camponotus* Mayr are widespread in Australia yet few of the 120 described species can be identified with certainty because revision of the group is lacking. Characters defining *Camponotus* in Australia are described by Shattuck (1999). Our objective here is to define a small group of apparently related species and revise them at species level. Identification of the mainland species is based on characters of minor workers as majors seldom leave the nest and are therefore infrequently encountered. This will be especially useful for those using ants as environmental indicators particularly when monitoring disturbance (Hoffman *et al.* 2000).

#### The subgenus *Colobopsis*

Most of the species treated here have been placed in the subgenus *Colobopsis* Mayr by earlier workers. The exceptions are *Camponotus janeti* Forel and *C. mackayensis* Forel which were placed in subgenus *Myrmamblyx* Forel.

Mayr (1861) established both *Camponotus* and *Colobopsis* as full genera. Emery (1889) first proposed *Colobopsis* as a subgenus of *Camponotus* although Bingham (1903) continued to recognise *Colobopsis* as a genus. Wheeler (1904) supported Emery's subgeneric concept and subsequent workers have followed suit. The subgeneric classification of *Camponotus* has not proven particularly useful. Emery (1896) was the first to attempt to subdivide

the genus into subsets by creating 26 subgenera. However, Forel (1914) disagreed with the proposed classification as he found it impossible to "disentangle the natural phylogeny of the genera". Later, Emery (1925) listed 40 subgenera created by himself and others and produced a key based on morphological characters. He characterized *Colobopsis* as "head more or less cylindrical and obliquely truncated" and *Myrmamblyx* as "head more or less distinctly truncated or obtuse anteriorly". He placed *conithorax* Emery, *ficator* Forel, *gasseri* Forel, *sanguifrons* Viehmeyer and *vitreus* Smith in the subgenus *Colobopsis* and *janeti* Forel and *mackayensis* Forel in the subgenus *Myrmamblyx*. These placements have been followed, without comment, since.

The subgeneric classification was queried by Brown (1972). He described it as "weak and inconsistent". This view was repeated by Bolton (1995) who stressed that many of the subgenera in *Camponotus* "were weak, poorly defined and untrustworthy". We support this view and can find little utility in the current classification. This is especially true for the subgenus *Colobopsis*. The subgenus has accumulated species of *Camponotus* which are phragmotic with little critical analysis of how they may be related to other phragmotic species. It is apparent that a number of unrelated groups has been artificially assembled within this subgenus and the group is undoubtedly polyphyletic. This is based on the morphology of the mesosoma, especially that of the propodeum, the mandibular dentition and the clypeal structure and its relationship with phragmotism in major workers (in some species the

\* South Australian Museum, North Terrace Adelaide SA 5000.

† CSIRO Entomology, PO Box 1700 Canberra ACT 2601.

posterior region of the clypeus is angled; in others it is flat). Unfortunately, resolving the *Colobopsis* predicament will require examining a wide range of taxa on a world-wide basis, an undertaking well outside the scope of the current project. Because of this, the species group proposed here may be broken into a number of groups in the future. However, the purpose of this paper is to resolve the species-level taxonomy of part of the Australian *Camponotus* fauna. We believe the recognition of this group is acceptable as it forms a moderate sized group that is well defined, a situation not found previously.

The *Camponotus macrocephalus* species group as described here should not be confused with the *C. ephippium* species group, the description of which is in preparation. *Camponotus ephippium* group major workers have been observed using their heads to block soil nest entrances but the truncated portion of the anterior head is rounded and not as flat, the fore femurs are not swollen, and the cheeks are swollen compared with *C. macrocephalus* group species. Also, *C. ephippium* group species nest in soil whereas *C. macrocephalus* group species generally nest in trees.

### Material

#### Measurements

CAR W = maximum frontal carina width; CLY W = clypeus width measured between tentorial pits; EL = eye length in dorsal view; HW = maximum head width in dorsal view; HT = maximum head thickness in lateral view; HL = head length measured from anterior margin of clypeus to vertex; PW = maximum pronotal width in dorsal view; NW = node width in dorsal view; TL = length of mid tibiae. Scale lines = 1 mm.

#### Location of material examined

ANIC = Australian National Insect Collection, Canberra, ACT; Curtin = Curtin University, WA; GMNH = Museum d'Histoire Naturelle, Geneva, Switzerland; MCG = Museo Civico di Storia Naturale "Giacomo Doria", Genoa, Italy; MCZ = Museum of Comparative Zoology, Harvard University, Cambridge, USA; SAMA = South Australian Museum, Adelaide, SA; ZMB = Museum für Naturkunde an der Universität Humboldt zu Berlin, Germany.

#### Collectors of material examined

AC, A. Calder; AJM, A. J. McArthur; ALH, A. L. Hertog; AML, A. M. Lea; AS, A. Salvarani; AZG, Adelaide Zoo Guides; BBL, B. B. Lowery; BFR, B. E. Rogers; BJW, B. J. Walker; BPM, B. P. M. Hyland; CDM, C. D. Michener; DHC, D. H. Colless; DJC, D. J. Cook; DPIQ, Department of Primary

Industry, Queensland; EC, E. Cameron; EFR, E. F. Riek; EGM, E. G. Mathews; EK, E. Kearney; EY, E. Yeatman; FAC, F. A. Cudmore; FPD, F. P. Dodd; Feu, Feuerherdt; GCh, G. Churchett; GBM, G. B. Monteith; GFG, G. F. Gross; GFH, G. F. Hill; GT, G. Turner; IDN, I. D. Naumann; J&NL, J. & N. Lawrence; JAF, J. A. Forrest; JAH, J. A. Herridge; JAh, J. Ahlers; JBS, J. B. Stuckey; JCC, J. C. Cardale; JCG, J. C. Goudie; JCl, J. Clark; JDM, J. D. Majer; JEE, J. E. Feehan; JJD, J. J. Davis; JMe, J. McCreavey; JS, J. Sedlacek; JT, J. Toma; KP, K. Pullen; LHM, L. H. Minchin; LW, L. Weatherill; MJN, M. J. Neave; MLS, M. L. Simpson; NMH, N. M. Hudson; PJF, P. J. Fargher; PJM, P. J. M. Greenslade; PSW, P. S. Ward; RAB, R. A. Barrett; RAP, R. A. Perkins; RE, R. Eastwood; RHM, R. H. Mew; RR, R. Robinson; RSB, R. S. Bungey; RVS, R. V. Southcott; RWT, R. W. Taylor; SOS, S. O. Shattuck; SEF, South Australian National Parks South East Fauna Survey; TAW, T. A. Weir; TC, T. Croft; TG, T. Greaves; Tur, Turner; WCC, W. C. Crawley; WLB, W. L. Brown; WMW, W. M. Wheeler; WR, W. Rafferty; YS, Y. Şakuri.

### Genus *Camponotus* Mayr 1861

#### *Diagnosis of Camponotus macrocephalus species group workers in Australia*

Fore femurs swollen, much greater in diameter than middle and hind femurs, generally more swollen than in most other *Camponotus* species (Fig. 1). Major workers and queens show distinct phragmosis, i.e. the anterior of the head is truncated

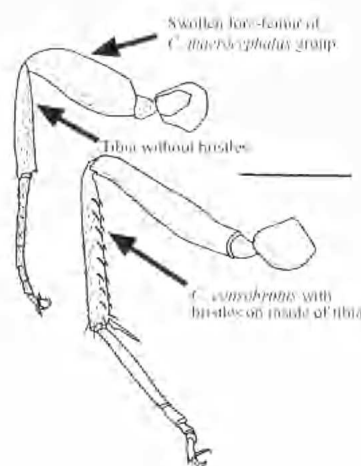


Fig. 1. *Camponotus macrocephalus* group. Morphology of the fore leg showing the swollen fore femur and absence of tibial bristles compared with *C. consobrinus*. Scale bar = 1 mm.

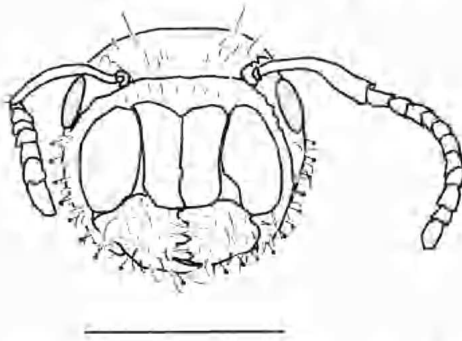


Fig. 2. *Camponotus sanguinifrons*. Anterior view of head of major worker showing phragmosis and clavate setae. Scale bar = 1 mm.

and flattened (Fig. 2). Workers are dimorphic, i.e. major and minor workers have practically no intermediaries as shown by head measurements (Fig. 11). Spines or bristles on the lower surfaces of the tibiae lacking, or at most, only one or two (most *Camponotus* species possess two rows of 5 to 10 spines) (Fig. 1).

The *Camponotus macrocephalus* species group can be divided into three complexes as follows:

1. *vitreus* complex: comprises *ametteae*, *conithorax*, *gasseri*, *janforrestae* and *vitreus*. This group is characterised by the depressed metanotal groove and high, arched propodeum.

2. *macrocephalus* complex: comprises *anderseni*, *howensis* and *macrocephalus*, all possessing a flat mesosomal dorsal surface and an elevated propodeal angle.

3. *janeti* complex: comprises *janeti*, *mackayensis* and *sanguinifrons*, all possessing a more evenly convex mesosoma.

#### Biology

Nests of these ants are generally found in galleries or tunnels which had been constructed in trees and shrubs by another insect. The nests are common in dead and living branches where the diameter exceeds 40 mm. Nests usually have only one entrance which is blocked in a remarkable way. A major worker uses its head like a cork to close the circular entrance, the diameter of which is only slightly greater than the worker's head. The heads of major workers and queens are more or less circular in cross section with the anterior portion truncated, flat and often deeply and coarsely sculptured, camouflaging the entrance when it is blocked. When the 'door keeper' removes its head from the hole, there is enough space to allow a nest mate to pass. Major workers are able to act as living doors because they have evolved a characteristic flat or phragmatic face (from Greek *phragmos*, 'fence' or 'fencing in'). Wheeler (1904)

has shown that workers wishing to gain entry appear to communicate to the 'door keeper' by its clypeus or mandibles, as all other sensitive parts, notably the eyes and antennae, are too far out of reach to receive stimuli from outside the entrance. Wheeler (1904) and Donisthorpe (1948) suggest that in Europe, workers of *Camponotus (Colobopsis) truncatu* Spinola (1808) are capable of excavating hard wood for their homes, a habit not found in Australian species which show a preference for rotten wood or preformed cavities. In Australia, galleries used by these ants are probably excavated primarily by termites.

#### Key to the minor workers *Camponotus macrocephalus* species group in Australia

1. Number of erect setae on dorsum of mesosoma greater than 5 ..... 2
- Number of erect setae on dorsum of mesosoma less than 5 (often 0) ..... 6
2. Erect setae on dorsum of mesosoma short (length < half EL) (Figs 5, 6) ..... *ametteae* sp. nov.
- Erect setae on dorsum of mesosoma long (length > half EL) ..... 3
3. Dorsal surface of propodeum concave (Figs 18, 19) ..... *mackayensis*
- Dorsal surface of propodeum flat or convex ..... 4
4. Dorsal surface of propodeum flat or weakly convex (Figs 14, 15) ..... *janeti*
- Dorsal surface of propodeum strongly convex and dome-like ..... 5
5. Underside of head with erect setae (Figs 16, 17) ..... *janforrestae* sp. nov.
- Underside of head lacking erect setae (Figs 24, 25) ..... *vitreus*
6. Propodeum separated from mesonotum by an angular metanotal groove ..... 7
- Propodeum and mesonotum in approximately the same plane and forming a continuous surface; metanotal groove essentially absent ..... 8
7. Propodeum cone-like, its dorsal and posterior faces meeting in an angle (Figs 7, 8) ..... *conithorax*
- Propodeum hemispherical, its dorsal and posterior faces rounding gradually into each other (Figs 9, 10) ..... *gasseri*
8. Dorsal face of propodeum relatively long compared to posterior face (ratio propodeal dorsum/declivity > 1.5) (Figs 22, 23) ..... *sanguinifrons*
- Dorsal face of propodeum relatively short compared to posterior face (ratio propodeal dorsum/declivity < 1.5) ..... 9
9. Eyes placed anteriorly, much closer to mandibles than vertex (Figs 3, 4) ..... *anderseni* sp. nov.
- Eyes placed near midline of head, slightly closer

- to vertex than mandibles. . . . . 10  
 10. Mandibles in major workers smooth and with shallow foveae, rugae weak and limited to the anterior region of the dorsal surface; limited to mainland Australia (Figs 20, 21)  
 . . . . . *macrocephalus*  
 Mandibles in major workers with distinct rugae superimposed over shallow foveae, the rugae covering the entire dorsal surface; occurring on Lord Howe Island (Figs 12, 13) . . . . . *howensis*

***Camponotus anderseni* sp. nov.**  
 (FIGS 3, 4)

**Holotype:** One major worker, pinned, Northern Territory, Leaders Ck, Gunn Point, 9/5/98, ALH (SAMA).

**Paratypes:** Three major workers and three minor workers in alcohol, same data as holotype (SAMA, ANIC).

**Worker diagnosis**

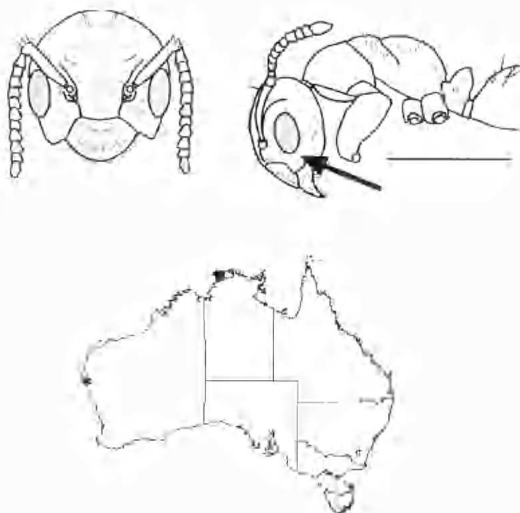
Mesosoma glossy with only a few erect setae and very sparse indistinct flat-lying setae, tibiae with slightly raised setae; eyes large, elongated, placed closer to mandibles than vertex (Fig. 3).

**Worker description**

**Major worker.** In lateral view. Head: Yellowish brown, grading darker posteriorly, side with plentiful small punctations spaced just greater than their diameter. Plentiful, short, erect setae tending sparse

on the side, with sparse flat-lying setae; antennae same color as anterior head, vertex with a few short, thick setae, underside of head without erect setae, eye large, much longer than wide, closer to mandibles than vertex. Pronotum: Light red brown, similar to anterior head, flatly convex with distinct prosternal structure, dorsum without setae or pubescence. Mesonotum: Light red brown slightly darker than head, mostly straight, dorsum without setae. Metanotum: Distinct, narrow, spiracle scarcely protruding. Propodeum: Light red brown, slightly darker than rest of mesosoma, dorsum and declivity mostly straight separated by widely rounded right angle, glossy, without pubescence; declivity short, straight, upright; spiracle situated four or five diameters anterior to declivity. Node and gaster: Brown, darker than mesosoma. Node: Without pubescence, anterior face convex, summit rounded, posterior face mostly straight. Gaster: Glossy. Fore femur: Brown grossly swollen. Mid tibia: Without pubescence, with few adpressed short setae outside, without bristles inside. In dorsal view. Head: Sides, parallel mostly straight; vertex and angles forming even convexity; scape without pilosity, thickened towards funiculus. Frontal carinae straight, diverging to wider than half HW; frontal area diamond shaped, anterior margin distinct, max HW at eye centre. Clypeus, frontal lobes and most of frontal area sunken. Clypeus: Anterior margin projecting, convex, integument finely shallowly punctate with plentiful very short, erect setae, without pubescence, without carina. In front or rear view. Node summit: Straight, wide, with few long setae. In top view. Node: Posterior surface flat, anterior convex.

**Minor worker.** In lateral view. Mesosoma, node, gaster and posterior head similar reddish brown, anterior head lighter. Head: Side with few small indistinct punctations, sparse, short, flat-lying setae; underside of head without long setae; scape and funiculus same color as anterior head; vertex with one or two short thick setae; eye nearly twice as long as wide, closer to mandibles than vertex. Pronotum: Anterior and posterior halves flat, separated by widely rounded angle, without setae. Mesonotum: Flatly convex, dorsum with one or two very short erect setae. Metanotum: Transverse, narrow; spiracle prominent, well below dorsum. Propodeum: Glossy, dorsum and declivity form even convexity, dorsum with few very short adpressed setae, ratio dorsum/declivity approximately 1; spiracle surrounded by glossy integument, without pubescence, situated four or five diameters anterior to declivity. Node: Without pubescence, anterior face mostly straight; summit rounded; posterior face mostly straight. Gaster: Glossy. Fore coxa: Light red brown, slightly darker above. Fore femur: Red brown, same color as mesosoma, grossly swollen.



Figs 3, 4. *Camponotus anderseni* sp. nov. 3. Minor worker, head and mesosoma. The eye is large and close to the mandibles. Fig. 4. Known distribution. Scale bar = 1 mm.

Fore tibia and Fore tarsus: Red brown same as mesosoma. Mid tibia: With few decumbent and adpressed short setae, without bristles inside. In dorsal view. Head: Sides and vertex evenly rounded; scape without pilosity, thickened towards funiculus; frontal carinae straight, diverging to wider than half HW; frontal area diamond shaped with distinct anterior margin; max. HW at eye centre. Clypeus: Finely and sparsely punctate, without pubescence, few setae around margin, without carina; anterior margin projecting, convex, wide. In front or rear view. Node summit: Widely rounded with a few setae.

#### Measurements

HW 0.80-1.20 mm, HL 0.90-1.30 mm, PW 0.60-0.90 mm, HT 0.60-0.95 mm, EL 0.32-0.35 mm, CARW 0.45-0.95 mm, CLYW 0.45 mm, TL 0.65-0.75 mm.

#### Etymology

Named after A. N. Andersen who recognised the uniqueness of this ant.

#### Remarks

This species has been found nesting in the mangrove *Sonneratia alba* J. Smith in the Northern Territory and Kimberley region of Western Australia (Fig. 4). At high tide the nests are submerged and during these times major workers use their heads to block nest entrances (A. N. Andersen, pers. comm, 2000). While this species is rare and known from only a small number of specimens, it is distinct from all others in this group.

#### *Camponotus annetteae* sp. nov. (FIGS 5, 6)

*Holotype*: One minor worker pinned, Cairns, Queensland, 9/8/75. BBL (ANIC).

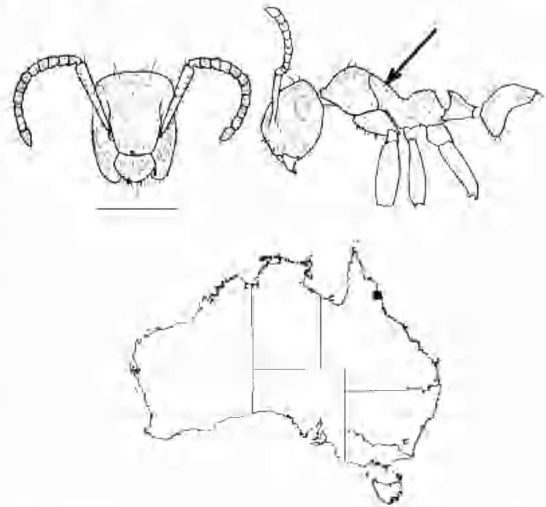
*Paratype*: One minor worker, same data as holotype (ANIC).

#### Worker diagnosis

Whole ant clothed in short erect setae. Mesosoma with a deep, wide depression ahead of the propodeum which is raised into a dome (Fig. 5).

#### Worker description

Minor worker: Whole ant covered with plentiful white, short, upstanding setae; red except for slightly lighter limbs and dark brown posterior gaster. In lateral view. Head: Glossy, indistinctly reticulate, few punctations, vertex bluntly margined. Pronotum: High dome with anterior and posterior halves



Figs 5, 6. *Camponotus annetteae* sp. nov. 5. Minor worker, head and mesosoma. Pilosity is plentiful. 6. Known distribution. Scale bar = 1 mm.

straight, dorsum with few flat-lying additional setae, feebly punctate. Mesonotum: Straight, long. Metanotum: Wide deep trough 0.25 mm wide with spiracles protruding to level of dorsal surface. Propodeum: Domed, near hemispherical, angle well rounded, declivity straight; spiracle protruding rearward surrounded by smooth, glossy, integument with a few short erect and flat-lying setae. Node: High, anterior face strongly concave; summit sharp, leaning forward; posterior face convex. Gaster: Red anterior, black posterior, glossy, smooth, fine flat-lying pubescence. Fore femur: Swollen. Mid tibia: Plentiful sub-erect setae outside, without bristles inside. In dorsal view. Head: Sides, posterior halves slightly convex, tapering in slightly; anterior halves straight, parallel; cheeks slightly swollen, vertex, nearly straight, scape with plentiful short erect setae. Frontal carinae very wide diverging strongly scarcely converging posteriorly. Anterior extremities of frontal carinae continuing transversely, forming a step along posterior clypeus; frontal area narrow transverse; max HW well anterior to eye centre, eyes situated less than half eye width from corners. Clypeus: Wide, slightly striate with elongated punctations, no truncation, glossy with plentiful short setae, carina distinct as narrow ridge on flatish clypeus, anterior margin lateral fifth intruding, median three fifths projecting evenly convex. In front or rear view. Node: Summit widely and deeply indented with plentiful short erect setae.

#### Measurements

HW 1.4 mm, HL 1.5 mm, PW 1.05 mm, HT 0.95 mm, EL 0.3 mm, CARW 0.85 mm, TL 1.3 mm.

*Etymology*

Named after A. Vincent, a scientific illustrator.

**Remarks**

This rare species is apparently restricted to Far North Queensland (Fig. 6). B. B. Lowery collected specimens from street trees in Cairns and noted that it appeared to mimic a red species of *Podomyrma*. Although *C. annetteae* is known from only two specimens it is highly distinctive and unlikely to be confused with any other species.

*Camponotus conithorax* Emery  
(FIGS 7, 8)

*Camponotus (Colobopsis) conithorax* Emery 1914: 430.

*Type examined*: One male labelled "Camp conithorax Emery" "Port Sandwich" "Mus Civ Gen." "Museum Paris Nouv Hebrides III. Mallicolo Dr Joly 1903" (MCG).

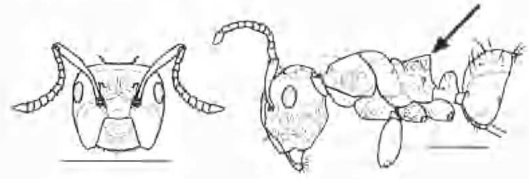
*Other material examined*: Queensland: Lockerbie, 10°48' S 142°28' E, 15/6/69, GBM (ANIC); Bamaga, 10°53' S 142°24' E, Feb-80, BPM (ANIC).

*Worker diagnosis*

Propodeum appears conical when viewed from side, upper and posterior surfaces straight and separated by an angle just greater than 90°. Scapes and tibiae with plentiful short fine setae, raised to an angle of about 10°. Very few erect setae on the outer surface of the head and none on the under side (Fig. 7).

*Worker description*

Major worker. In lateral view. Pronotum, anterior mesonotum, limbs and gaster brown, posterior mesonotum, propodeum and node darker brown, nearly black. Head: Dark brown, lighter in front; side glossy, smoothly reticulate with very sparse flat-lying short setae; scape dark brown like posterior head; funiculus lighter like anterior head; vertex with one or two erect setae; underside of head without erect setae, with few very short adpressed setae. Pronotum: Glossy, flatly convex, dorsum with one or two long setae, without pubescence. Mesonotum: Glossy, evenly convex without setae or pubescence. Metanotum: Separated from mesonotum and propodeum by deep transverse cuts raised up in centre; spiracles placed well below dorsum, slightly protruding upward. Propodeum: Posterior dorsum inclined upward, conical, glossy, with few short adpressed setae; angle approximately 90°, sharply rounded; declivity mostly straight; ratio dorsum/declivity approximately 1; spiracle



Figs 7, 8. *Camponotus conithorax*. 7. Minor worker, head and mesosoma. Propodeal angle is conical. 8. Known distribution of *C. conithorax*. Scale bars = 1 mm.

protruding to rear, surrounded by glossy integument with a few short indistinct flat-lying setae. Node: Glossy with sparse flat-lying and sparse erect, short setae; anterior face convex above; summit blunt; posterior face straight. Gaster: Dark brown, lighter posteriorly; glossy. Fore femur: Swollen. Mid tibia: Plentiful short, decumbent setae, without bristles inside. In dorsal view. Head: Sides straight, parallel; vertex straight; scape with sparse, short flat-lying setae; frontal carinae wide, diverging strongly then converging slightly at posterior; frontal area diamond shaped with an anterior pit; max HW at eye centre. Truncation: Near posterior clypeus. Clypeus: Sides mostly parallel, long, diverging anteriorly, with few feeble striations and punctations, without furrows, glossy, with few very sparse, flat-lying setae, anterior margin projecting, mostly straight with weak median concavity, with few long setae; without carina. In front or rear view. Node: Narrow, summit straight with few short setae.

Minor worker. In lateral view. Pronotum, anterior mesonotum and gaster brown; posterior mesonotum, propodeum and node darker brown, limbs a little lighter coloured than mesosoma. Head: Dark brown, grading to yellowish brown anteriorly; side with sparse flat-lying short setae; glossy, smoothly reticulate; scape dark brown, like posterior head; funiculus lighter, like anterior head, vertex with sparse, short, flat-lying setae; underside of head without erect setae, with few very short, adpressed setae. Pronotum: Anterior third convex, otherwise straight without setae or pubescence. Mesonotum: Evenly flatly convex, dorsum without setae or

pubescence. Metanotum: Separated from mesonotum and propodeum by deep transverse cusp, raised in the centre; spiracles placed well below dorsum, slightly protruding up. Propodeum: Dark brown with few short adpressed setae; dorsum slightly convex, slightly inclined upward; angle blunt 90°; declivity very straight; ratio dorsum/declivity near 1; spiracle protruding to rear surrounded by glossy integument with few short, sparse setae. Node: Glossy with few very short, erect setae; petiole with ventral protuberance; lower half of anterior face of node straight, otherwise convex; summit blunt; posterior face mostly straight. Gaster: Glossy. Fore femur: Swollen. Mid tibia: With short decumbent setae, lacking bristles inside. In dorsal view. Head: Sides flatly convex, tapering to front; vertex convex, scape with sparse, short, flat-lying setae; frontal carinae wide, nearly parallel; frontal area diamond shaped, indistinct; max HW at eye centre. Clypeus: Glossy with few sparse flat-lying and erect setae, without carina; anterior margin wide, mostly straight, projecting but not beyond cheeks. In front or rear view. Node: Narrow, summit rounded with few erect long setae.

#### Measurements

HW 1.5-2.1 mm, HL 1.6-2.3 mm, PW 1.1-1.3 mm, HT 1.2-1.6 mm, EL 0.4-0.5 mm, TL 1.6-1.9 mm.

#### Remarks

Emery (1914) described minor workers from Vanuatu (then the New Hebrides). The major worker is described here for the first time. The identity of the Australian specimens is based on comparison with the only known type specimen (a male paratype) and the brief description (Emery 1914, including Fig. 18 in Plate 13). BMP collected specimens nesting in a hollow twig of *Endospermum* at Bamaga, Qld.

#### *Camponotus gasseri* (Forel) (FIGS 9-11)

*Colobopsis gasseri* Forel 1894: 233.

*Camponotus (Colobopsis) gasseri* Forel 1902: 507  
Combination.

*Camponotus (Colobopsis) gasseri* Forel 1912: 90.

*Camponotus (Colobopsis) gasseri lysias* Forel 1913: 193.

*Camponotus (Colobopsis) gasseri obrusitruuncatus* Forel 1902: 508.

*Camponotus (Colobopsis) gasseri obrusitruuncatus* Emery 1925: 148 Spelling change.

*Camponotus (Colobopsis) gasseri coloratus* Wheeler 1934: 162.

*Types examined: Camponotus gasseri.* Typus, from

Perth, W. A., major and minor workers, Box 176 (GMNH). *Camponotus gasseri obrusitruuncatus.* Typus, from Mackay, Qld, major and minor workers, Box 176 (GMNH). *Camponotus gasseri lysias.* Typus, from Ulverstone, Tas., three workers, Box 176 (GMNH).

*Other material examined:* Australian Capital Territory; Black Mountain, 1931, TG (ANIC); Canberra, 1935, TG (ANIC); Kowen, Brindabella Range, 1932, TG (ANIC); Red Hill, 1931, TG (ANIC); Uriarra, 1931, TG (ANIC). New South Wales; Armidale, 1982, YS (ANIC); Berrigan State Forest, 1979, BBL (ANIC); Braidwood Road, 1935, TG (ANIC); Brookvale, 1931, TG (ANIC); Burns Bay, Lane Cove, 1959, BBL (ANIC); Guyra, 2 mi. S., 1949, TG (ANIC); Kioloa State Forest, 1998, SO5 (ANIC); Mt Wog Wog, 4 km NE, 1986, TAW (ANIC); Nyngan, 1948, JMc (ANIC); Port Macquarie, 1968, KP (ANIC); Ryde Caravan Pk., 1966, RIIM (SAMA); Wyong National Forest Oorinba, 1967, BBL (ANIC), Queensland; Beerwah, 1958, CDM (ANIC); Beerwah, JDM (Curtin), Beerwah State Forest, 1958, CDM (ANIC); Cairns, 1971, BBL (SAMA); Upper Gayundah Creek, 1984, GBM, DJC (ANIC). South Australia: Adelaide Botanic Park, 2000, AZG (SAMA); Aldinga, 1987, JAF, EGM (SAMA); Aldinga, 2000, AJM, PJF (SAMA); Aldinga, 3 km SW, 1989, PSW (ANIC); American R., 1973, PJM (SAMA); Banff, 1975, PJM (ANIC); Belair, 1999, AJM (SAMA); Belair, 1973, PJM (ANIC); Beltana, 15 km ENE, 1975, PJM (SAMA); Breakneck R., 1973, PJM (ANIC); Burnside, Undelcarra, 1996, MLS (SAMA); Cape



Figs 9, 10. *Camponotus gasseri*. 9. Minor worker, head and mesosoma. Propodeum is humped and glabrous. 10. Known distribution. Scale bars = 1 mm.

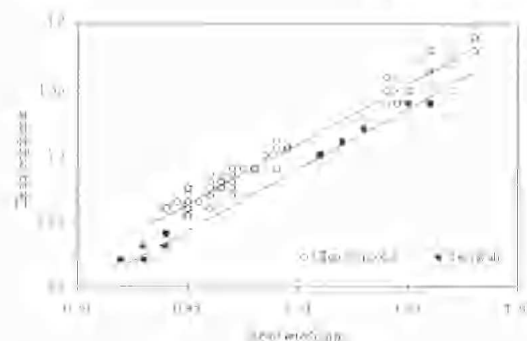


Fig. 11 Graph showing dimorphism in head dimensions of *Camponotus glyseri* from Glen Osmond, South Australia ( $n = 60$ ,  $R^2 = 0.95$ ) and from Beerwah, Queensland ( $n = 10$ ,  $R^2 = 0.94$ ). Queensland specimens were smaller.

Borda, 8 mi. E, 1973, PJM (SAMA); Ceduna, 10 mi SE, 1975, JAH (SAMA); Clare, 1950, JMc (ANIC); Dudley CP, GCh (SAMA); Ferris Macdonald CP, 1964, GFG (SAMA); Flinders L., 1987, JEF, MJN (ANIC); Glen Osmond, 1976, PJM (ANIC); Greenly I. (SAMA); Kangaroo I., AML (SAMA); Hanson Bay, 1973, PJM (ANIC); Head of Great Australian Bight, 1988, JAF (SAMA); Innes CP, 1976, PJM (SAMA); Kalangadoo, 15 km W, 1995, BFR (SAMA); Kelly Hill Caves, 1972, PJM (ANIC); Kongorong, 1997, SEF (SAMA); Little Dip CP, 1978, PJM (SAMA); Loftia Pk, 1990, JAF (SAMA); Lucindale, Feu (SAMA); Meningie, LHM (SAMA); Meningie, 10 km SW, 1974, PJM (SAMA); Mingbool, 1987, AJM (SAMA); Mt Benson, 21 km NE, 1997, SEF (SAMA); Mt Compass, 1969, BBL (SAMA); Mt Compass, 1969, BBL (ANIC); Mt Lofty, 1978, EY (ANIC); Mt Remarkable CP, 1973, PJM (ANIC); Mt Rough, 5 km W, 1972, PJM (ANIC); Naracorte Cave CP, 1958, GFG (SAMA); Nappayalla, 1 km W, 1984, RR (SAMA); Norwood, 1971, BBL (SAMA); Oraparinna, 1971, PJM (ANIC); Portee, 1999, AJM (SAMA); Ravine Des Casoars, 7 km N, 1990, EGM, JAF (SAMA); Reevesby L., 1936, JC (SAMA); Riverton, 1975, PJM (ANIC); Rocky R., 1972, PJM (ANIC); Sandy Ck, 1972, PJM (ANIC); Sevenhill, 1957, BBL (ANIC); Spalding Cove, 1973, PJM (ANIC); Streaky Bay, 1957, BBL (ANIC); Tintinara, 10 mi. E, 1958, TG (ANIC); Umberlatana, 1975, PJM (ANIC); Umberlatana, 15 km NE, 1975, PJM (ANIC); Western Flal, 8 km S, 1994, TC (ANIC); Tasmania: Asbestos Ra., 1991, BBL (ANIC); Asbestos Ra., 1990, BBL (SAMA); Bakers Beach, 1992, BBL (SAMA); Bakers Beach, 1993, BBL (SAMA); Bruny I. Aerodrome, 1992, BBL (SAMA); Burnie, 5 km E, 1994, BBL (SAMA); Devonport, The Bluff, 1993, BBL (SAMA); Flinders I., 1992,

BBL (SAMA); Furneaux Lookout, 1992, BBL (SAMA); Great Bay, North Bruny I. 1992, BBL (SAMA); Hobart, AML (SAMA); Hobart, 1938, FAC (ANIC); Hobart, 1951, NMH (ANIC); Hobart, 1935, WR (ANIC); Launceston, 1915 (SAMA); Lavinia Res, King I., 1992, BBL (ANIC); Maria I., 1992, BBL (SAMA); Mt Tanner, 1991, BBL (SAMA); Mt Wellington 500m slope, 1991, BBL (SAMA); North Bruny I., 1992, BBL (SAMA); Port Sorell, 1992, BBL (SAMA); Rocky Cape Sisters Beach, 1994, BBL (SAMA); Seal Rocks, King I., 1991, BBL (SAMA); Surprise Bay, 4 km N, 1994, BBL (SAMA); Swansea, 1962, LW (SAMA); Swansea, Nine Mile Beach, 1996, BBL (ANIC); Hobart, AML (SAMA); Tunbridge, 1992, BBL (SAMA); Walkers Lookout, 2 km N, 1995, BBL (SAMA); Victoria: Aireys Inlet, 1945, JMc (ANIC); Greensborough, JMc (ANIC); Hursbridge, 1958, BBL (ANIC); Orbol, 1959, GFG (SAMA); Springvale, RVS (SAMA); Ultima, JCG (SAMA); Western Australia: Cunderdin, 1 km E, 1985, PSW (ANIC); Darlington, 1969, BBL (ANIC); Dryandra, 1982, JDM (Curtin); Esperance, 1970, BBL (SAMA); Esperance, 1970, BBL (ANIC); Junana Rock, 1977, RWT (ANIC); Kings Park, 1969, BBL (ANIC); Mt Ragged, 11 km NW by N, 1969, RWT (ANIC); Mundaring Weir, JCl (ANIC); Normalup, 1984, J&NL (ANIC); Norseman, 15 km ENE, 1969, RWT (ANIC); Norseman, 4 km NNE, 1969, RWT (ANIC); Nonhampton, 5 km N, 1985, PSW (ANIC); Pingrup, 1958, TG (ANIC); Stirling Ra. NP, 1984, J&NL (ANIC); Widgiemooltha, 8 mi. N by W, 1969, RWT (ANIC); Worsley, JDM (Curtin); Yanchep, JDM (Curtin); Zanthus, 1 mile SE by E, 1969, RWT (ANIC).

#### Worker diagnosis

A few erect setae on the front of the head and gaster; none elsewhere. Mesosoma glossy with propodeum raised to hemispherical dome (Fig. 9).

#### Worker description

Major worker. Whole ant varies from black with patches of red or red brown to occasionally all red. In lateral view. Head: Side without erect setae, posterior three quarters, very finely punctate; anterior quarter striate, truncation  $135^\circ$  abrupt; vertex with a few setae; underside of head without setae. Pronotum and mesonotum forming rounded symmetrical hump, slightly flattened on top, without setae. Metanotum: Two distinct transverse sutures at bottom of a trough, spiracle directed upward, placed below dorsum. Propodeum: Without setae, dorsum hemispherical dome; angle rounded; declivity straight; ratio dorsum/declivity approximately 1; spiracle placed midway between dorsum and coxa, surrounded by fine reticulations and very sparse, short, flat-lying, coarse setae. Node: Finely reticulate, glossy, without



pilosity; anterior face mostly straight; summit rounded; posterior face mostly straight. Gaster: Very finely striate, no pubescence, few short setae along membranes. Fore femur: Swollen. Mid tibia: Without erect setae, with very sparse, indistinct, flat-lying setae without bristles inside. In dorsal view. Head: Sides, posterior half straight, parallel; anterior half slightly convex, tapering to the front; vertex flatly convex, widely rounded corners; scape without erect setae; frontal carinae wider than half HW; frontal area indistinct, max HW posterior to eye centre; mandibles with many fine teeth. Clypeus: Coarsely striate longitudinally, without pubescence, carina replaced with groove; anterior margin convex, narrow, projecting. In front or rear view. Node: Wide, summit widely bidentate, without setae.

Minor worker. Whole ant varies from black with patches of red or red brown to occasionally all red. In lateral view. Head: Side, glossy, finely reticulate with sparse, short, flat-lying setae; vertex with a few long setae; underside of head without setae. Mesosoma and node without erect setae or pubescence. Pronotum and mesonotum humped forming even convexity higher than metanotum. Metanotum: Deep wide trough with convex base; prominent spiracles pointing upward, placed near level of dorsum. Propodeum: Elevated, high, humped, evenly convex; angle well rounded; declivity mostly straight; ratio dorsum/declivity approximately 1; spiracle placed midway between dorsum and coxa, pointing rearward, surrounded by glossy, finely reticulate integument. Node: Anterior face lower half straight, upper convex; summit rounded; posterior face straight. Gaster: Microscopically striate. Fore femur: Swollen. Mid tibia: Sparse short, fine, adpressed setae, without bristles inside. In dorsal view. Head: Sides, flatly convex, tapering to front; vertex and angles uniformly convex; scape without erect setae, with indistinct adpressed setae. Frontal carinae short, very wide apart, mostly diverging; frontal area indistinct; max HW at eye centre. Clypeus: Wide, without truncation, few setae on margins, glossy, finely punctate-reticulate; carina distinct; anterior margin convex. In front or rear view. Node: Summit flatly convex, wide, without setae.

#### Measurements

HW 0.90-1.60 mm, HL 1.00-1.70 mm, PW 0.65-1.20 mm, TL 0.90-1.10 mm.

#### Remarks

Wheeler (1934) described the subspecies *coloratus* based on "smaller average size and different colour pattern" and admitted that it was "only a slight variant of the typical form." Forel (1913) described

the subspecies *lysias* as "differing in head shape from *C. gasseri* but otherwise identical with the type". Forel (1902) established the subspecies *obtusitruncatus* based on slight differences in head and mesosoma shape, sculpturing and colour, with the minor worker "having a shorter head and more convex pro-mesonotum, with the rest identical" to the typical form. We can find little to support the retention of any of these subspecies because the differences are trivial. *Camponotus gasseri* specimens collected at Beerwah, Queensland were light brown and smaller than those collected at Glen Osmond, South Australia as shown in Fig. 11. The stated differences in major workers are of little value in diagnosing these forms as they seem to be based on allometric variation within this caste rather than species-level differences.

*Camponotus gasseri* minor workers are often observed foraging on trunks of eucalypts in the Adelaide metropolitan area. On 20 Jan 1999, AJM when watching the removal of a large live *Eucalyptus camaldulensis* Dehnh at Glen Osmond, a south-eastern suburb of Adelaide, collected a sawn off log which housed a colony of *C. gasseri*. The diameter of the log was 120 mm and the ants' entrance was nearly 2 mm in diameter, at the junction of a dead offshoot of the log. On cutting open the log, 1142 workers, three dealate queens, one alate male and numerous eggs and naked larvae were found. The volume of the gallery, measured by filling it with water, was 125 mL. About 10 ml of frass resembling sawdust was also taken from the gallery. The gallery appeared to have been excavated by termites (determined by examination of the frass, P. Gleeson, pers. comm. 1999) and was located in the central heart wood and extended for about 300 mm, with the entrance tunnel about equidistant from each end. The width of the main gallery was about 10 mm diameter at the centre. Most of the ants were jet black with a little red at the anterior head, the amount of red being variable. In a few individuals the black was replaced by yellow-brown.

Wheeler (1934) described nests of *C. gasseri* near Perth, WA in branches of varying sized *Leptospermum* spp., *Acacia* spp., *Eucalyptus* spp. and *Callitris* spp. Most of the specimens of *C. gasseri* examined here have been collected while the ants were foraging on vegetation, except for one collection from a pitfall trap and one from leaf litter and those collected from the sawn off log described above.

#### *Camponotus howensis* Wheeler (FIGS 12, 13)

*Camponotus (Calotropis) howensis* Wheeler 1927: 152.

*Types examined:* Nine minor workers from Lord Howe Island. A. M. Lea (MCZ).

*Other material examined:* New South Wales: Lord Howe Island, Erskine Valley, 1966, RWT (ANIC); Lord Howe Island, Middle Beach Track, 2000, AJM & PJF (SAMA).

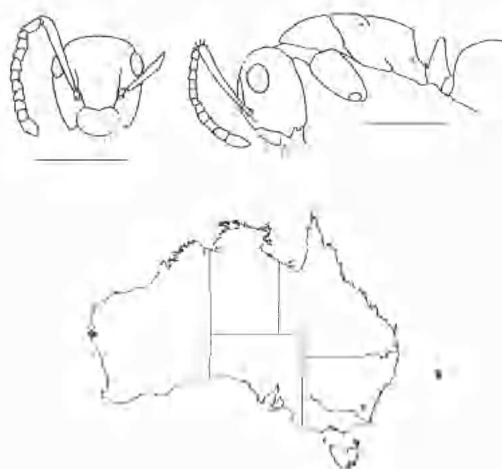
#### *Worker diagnosis*

Mandibles in major workers with distinct rugae superimposed over shallow foveae, rugae covering the entire dorsal surface of mandible. A few long, erect setae on head and gaster, none elsewhere. In lateral view, dorsal surfaces of pronotum, mesonotum and propodeum form a continuous weakly convex surface; posterior propodeal face slightly concave (Fig. 12).

#### *Worker description*

**Major worker.** In lateral view. Red brown, gaster generally darker, limbs similar in colour but with tarsi and tibiae slightly lighter. Head: Side with no erect setae; posterior glossy, smooth; anterior sharply truncated, anterior striations extending from truncation one-third distance to eye; vertex with few long setae; underside of head without erect setae, with very sparse, short, flat-lying setae. Mesosoma: Without erect setae. Pronotum and Mesonotum: Evenly convex. Metanotum: Wide trough, spiracle well below dorsum. Propodeum: Dorsum evenly curved; angle, rounded; declivity slightly concave, ratio dorsum/declivity approximately 1; spiracle well forward of declivity, closer to coxa than dorsum surrounded by indistinctly reticulate, glossy integument, without pilosity. Node: Without setae, anterior face lower half, straight, upper half evenly convex; summit blunt; posterior face straight. Gaster: Glossy indistinctly striate. Fore femur: Swollen. Mid tibia: Without erect setae, with sparse, flat-lying pubescence, without bristles inside. In dorsal view. Head: Nearly rectangular, sides straight, parallel; vertex straight; angles blunt; scape with very sparse, short, flat-lying setae. Frontal carinae mostly straight, diverging; posterior very wide. Frontal area, very small, depressed. Clypeus sides bordered by sharp ridge, narrow, widest at truncation; sides nearly straight, tapering anteriorly, grossly ridged longitudinally, similar to cheeks; three fourths of clypeus anterior to truncation. Anterior head comprising clypeus, mandibles and cheeks lying on flat circular plane; max HW at eye centre; eyes oval. Clypeus: Without erect setae, carina present, among striations; anterior margin narrow, projecting, evenly convex, in front or rear view. Node: Summit wide, slightly indented, without setae.

**Minor worker.** Head: Red-brown to dark brown, limbs and antennae slightly lighter colour, anterior of



Figs 12, 13. *Camponotus bowensis*. 12, Minor worker, head and mesosoma. 13, Known distribution. Scale bars = 1 mm.

head yellow brown, vertex with few setae; underside of head without erect setae. Mesosoma: Glossy, microscopically reticulate without pilosity. Pronotum: Anterior and posterior thirds straight, centre third convex. Mesonotum: Mostly straight, slightly raised above pronotum and propodeum. Metanotum: Slight ridge, spiracle near middle of side. Propodeum: Dorsum straight to flatly convex; angle abrupt; declivity concave; ratio dorsum/declivity about 1.5; spiracle situated midway between dorsum and coxa surrounded by glossy microscopically reticulate integument. Node: Without pilosity; anterior face lower half straight, convex above; summit sharp; posterior face straight. Gaster: Finely striate. Fore femur: Swollen. Mid tibia: With indistinct sparse, short, flat-lying setae, without bristles inside. In dorsal view. Head: Sides straight, slightly tapering to the front, vertex and angles forming an even convexity; scape with indistinct, sparse, short, flat setae; frontal carinae diverging widely; frontal area indistinct, diamond shaped; max HW just posterior to eye centre. Clypeus: Glossy, finely reticulate, few sparse, erect setae; carina feeble; anterior margin convex, wide, projecting, in front or rear view. Node: Summit wide, sometimes indented, without setae.

#### *Measurements*

PW 0.90-1.06 mm, HT 1.06-1.28 mm, EL 0.44-0.45 mm, HW 1.31-1.64 mm, HL 1.48-1.82 mm, CAR W 0.63-0.89 mm, CLY W 0.60-0.63 mm, TL 0.95-1.15 mm, NW 0.48-0.55 mm.

#### **Remarks**

Wheeler (1927) described *Camponotus bowensis*

based on minor workers from Lord Howe Island. His description includes comparisons with a number of species from nearby Pacific islands but makes no reference to mainland Australian species such as *C. macrocephalus*. A more recent collection from Lord Howe Island by RWT includes both major and minor workers, minors of which match Wheeler's types. The specimens from Lord Howe Island are very similar to mainland specimens placed in *C. macrocephalus*. They differ in having the dorsal surface of the mandibles of major workers sculptured with longitudinal rugae superimposed over shallow foveae. The mandibles in *C. macrocephalus* are smooth with singular foveae and with, at most, weak rugae along the anterior (the region away from the head capsule) one-half or less. Additionally, the sculpturing on the anterolateral region of the head between the eye and the base of the mandible in major workers of *C. howensis* tends to be less extensive and weaker than the sculpturing found in *C. macrocephalus*. Finally, the colour of the Lord Howe Island material (all castes) is consistently dark brown while mainland material varies from yellow-brown to dark brown. No significant differences could be found between the minor workers from these regions. Based on this, these two taxa are treated as distinct with an acknowledgment that they are very closely related and may well prove to be conspecific.

*Camponotus janeti* Forel  
(FIGS 14, 15)

*Camponotus janeti* Forel, A, 1895b: 417.

*Camponotus (Myrmaniblyes) janeti* Forel 1914: 271  
Combination.

*Camponotus janeti* Emery 1925: 138.

*Type examined*: Major and minor workers labelled "Typus from Queensland, Mackay." Box 174 (GMNH, ANIC).

*Other material examined*: Queensland: Cairns Parklands, 1975, BBL (ANIC); Mackay, 1949, TG (ANIC).

*Worker diagnosis*

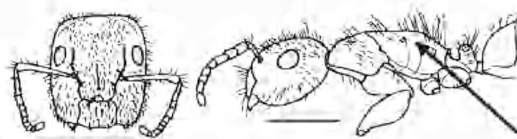
Mesosoma low and long in profile with plentiful long, erect setae. Head, including underside, and scapes with plentiful long, erect setae (Fig. 14).

*Worker description*

Major worker: Very dark brown to black all over except red teeth; red brown antennae, lighter limbs. In lateral view. Head: Side glossy, finely reticulate; finely punctate with plentiful mid length setae (about 0.2 mm long), vertex with plentiful erect setae and no pubescence; underside of head with plentiful short and long, erect setae. Pronotum: Uniformly

flattily convex, dorsum with plentiful mid length erect and few flat-lying setae. Mesonotum: Flattily convex, dorsum with plentiful erect setae; sides reticulate, more strongly below than above. Metanotum: Indistinct. Propodeum: Dorsum with plentiful erect setae, uniformly convex; sides reticulate, more strongly below than above; angle widely rounded; declivity straight; ratio dorsum/declivity approximately 1; spiracle projecting rearward, well forward of declivity, and midway between coxa and dorsum, surrounded by erect and flat-lying setae. Node: With long, erect and short, flat-lying setae; anterior face, lower half straight, upper convex; summit blunt; posterior face, lower half straight upper half convex. Gaster: Finely striate. Fore femur: Swollen. Mid tibia: Plentiful upstanding long setae, without bristles inside. In dorsal view. Head: Very finely densely punctate with few coarse punctations; sides straight, slightly tapering to front; vertex convex; scape with erect and flat-lying setae. Frontal carinae wide, strongly diverging at front, posterior half straight; frontal area small, diamond shaped, smoother than surroundings; max HW just posterior to eye centre. Clypeus: Without striations, scarcely truncated, sides widest at centre, less than one third HW, with few erect setae and no pubescence, without carina; anterior margin projecting, straight, narrow. In front or rear view. Node: Summit wide, outer thirds convex, centre third straight or slightly concave; with plentiful long setae.

Minor worker: In lateral view. Very dark brown to black all over except red mandibles, lighter antennae, darker red brown limbs. Head: Side glossy, finely reticulate with plentiful mid length and longer setae.



Figs 14-15. *Camponotus janeti*. 14. Minor worker, head and mesosoma. Mesosoma is low and long. 15. Known distribution of *C. janeti*. Scale bars = 1 mm.

vertex with plentiful, erect setae, no pubescence; underside of head with plentiful longish erect setae. Pronotum: Rounded lateral margin, uniformly flatly convex; dorsum with plentiful erect and few flat-lying setae. Mesonotum: Flatly convex, dorsum with plentiful long erect setae. Metanotum: A slight depression. Propodeum: Dorsum with plentiful erect setae of various lengths; uniformly convex, making whole mesosoma evenly convex; sides more strongly reticulate below than above, angle widely rounded; declivity flatly convex; ratio dorsum/declivity about 1.5; spiracle projecting outward, well forward of declivity and midway between coxa and dorsum; surrounded by erect and flat-lying setae. Node: Long, with long erect and short, flat-lying setae; anterior face lower half straight convex above; summit rounded with weak ridge; posterior face lower half straight, upper half convex. Gaster: Glossy slightly finely striate. Fore femur: Swollen. Mid tibia: With plentiful coarse, mostly decumbent setae, without bristles inside. Dorsal view. Head: Very finely and densely punctate, sides straight, strongly tapering to front; vertex convex, angles widely rounded; scape with erect and flat-lying setae; frontal carinae wide, strongly diverging; frontal area distinctly diamond shaped, depressed; max HW at eye centre; eyes close to corners. Clypeus: Wide, with few short decumbent setae; carina distinct; anterior margin projecting, mostly convex. Front or rear view. Node: Summit wide, convex, with plentiful long setae.

#### Measurements

HW 0.95-1.70 mm, HL 1.00-2.00 mm, PW 0.70-1.15 mm, HT 0.75-1.00 mm, EL 0.25-0.35 mm, CAR W 0.50-0.90 mm, CLY W 0.50-0.65 mm, TL 0.90-1.20 mm.

#### Remarks

This rare species has been collected only a few times from northern Queensland. The only biological notes refer to one collection from a tree in parkland,

#### *Camponotus janforrestae* sp. nov. (FIGS 16, 17)

*Holotype*: One minor worker pinned, Queensland, Cairns, Parklands, 2/8/75, B. B. Lowery (ANIC).

*Other material examined*: Queensland; St. George, near Balonne River, 1966, BBL (ANIC); St. George, Balonne River bank, 1966, BBL (ANIC).

#### Worker diagnosis

Whole ant (with the exception of the funiculus) clothed in erect setae. On mesosoma setae vary from

short to long. Dorsal surface of propodeum strongly convex and dome-like (Fig. 16).

#### Worker description

Minor worker. All black except for dark brown teeth and limbs. In lateral view. Head: Side with few erect setae, without flat-lying pubescence, glossy, smooth; vertex with plentiful long setae; underside of head with plentiful long and short setae. Pronotum: Evenly convex with plentiful erect setae of various lengths. Mesonotum: Flatly convex with plentiful setae. Metanotum: Deep trench, with spiracles projecting up, apertures below level of dorsum. Propodeum: Plentiful long setae, glossy, dorsum domed, nearly circular; angle rounded; declivity mostly straight, spiracle projecting outward, surrounded by slightly punctate integument with flat-lying and erect setae. Node: Thick with plentiful long erect setae; anterior face short upright; summit blunt; posterior face lower half straight; upper convex. Gaster: Glossy, hairy. Fore femur: Dark red brown, swollen. Mid tibia: With plentiful long and a few short, erect setae, without bristles on inside. In dorsal view. Head: Sides straight, strongly tapering to front, posterior angles and vertex forming even convexity, scape with plentiful long and short, erect setae. Frontal carinae wide, diverging to rear, not converging; posterior width twice anterior; frontal area elongated diamond, small; max HW posterior to eye centre. Clypeus: Wide, glossy, smooth, without flat-lying pubescence, with few erect, long setae; carina indistinct; anterior margin lateral quarters projecting forward, median half indented between two teeth. In front or rear view. Node: Summit flat, between convex lateral thirds, with plentiful long setae of varying length.

#### Measurements

HW 1.6 mm, HL 1.8 mm, PW 1.2 mm, HT 1.25 mm, EL 0.35 mm, TL 1.7 mm.

#### Etymology

Named after J. A. Forrest OAM, SAM, Adelaide.

#### Remarks

This rare species has been collected only three times. The limited biological information indicates that it was common on box and gum trees on black soil and was foraging all afternoon at St George. It is highly distinctive and unlikely to be confused with other members of this species group.

#### *Camponotus mackayensis* Forel (FIGS 18, 19)

*Camponotus reticulatus mackayensis* Forel 1902: 506.

*Camponotus (Myrmamblys) reticulatus mackayensis* Emery 1925: 139 Subgeneric assignment.

*Type examined:* Major and minor workers, labelled "typus". Box 174 (GMNH, ANIC).

*Other material examined:* Northern Territory: Caiman Ck, 1977, TAW (ANIC); Darwin, 1961, LW (ANIC); Howard Springs, 1951, WLB (ANIC); Kakadu NP, 1994, BBL (SAMA); Smith Point, 1977, RAB (ANIC); Smith Point, 1977, TAW (ANIC); Smith Point, 5 mi. E by S, 1977, TAW (ANIC); Wangi Falls, 1994, BBL (SAMA); Wessel I., Rimbihi I., 1977, TAW (ANIC). Queensland: Cairns, 1962, RWT (ANIC); Cairns Edge Hill, 1975, BBL (ANIC); Edge Hill (ANIC); Lake Eacham NP, 1972, RWT (ANIC); Mingela, 1 km E, 1977, BBL (ANIC); Missionary Bay, 1977, RWT (ANIC).

#### *Worker diagnosis*

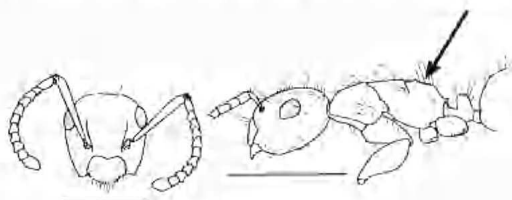
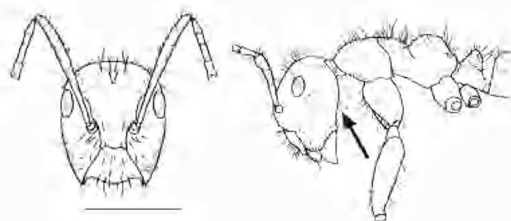
Dorsal surface of propodeum with shallow concavity. Sparse to plentiful erect, long setae on most surfaces, including scape (Fig. 18).

#### *Worker description*

Major worker. In lateral view. Head: Red brown, anterior half coarsely punctate with plentiful short, whitish, sub-erect setae, posterior half smooth, glossy, with few shallow punctations; scape brown, funiculus lighter red brown; vertex with plentiful short setae, few shallow punctations; underside of head with short setae. Pronotum: Red brown, lighter than mesonotum, evenly convex, dorsum with few long and short setae. Mesonotum: Brown, evenly

convex, dorsum with plentiful short setae. Metanotum: Distinct, wide, shallow groove. Propodeum: Brown, dorsum with few long setae, anterior dorsum marked by narrow ridge, otherwise straight; angle abrupt; declivity straight; ratio dorsum/declivity approximately 1; deeply striate near spiracle. Node: With few long setae, brown; anterior face lower half straight, upper convex; summit blunt; posterior face straight. Gaster: Brown, finely striate. Fore coxa: Mostly red brown with some yellow. Fore femur: Red brown, swollen. Fore tibia and tarsus: Red brown. Mid tibia: Outside with sparse flat-lying, short setae, without bristles inside. In dorsal view. Head: Sides straight tapering to front; vertex straight, slightly concave in some views; frontal area small, depressed and extended longitudinally; frontal carinae nearly parallel, anterior half diverging, posterior half wide, plentiful short, sub-erect setae on clypeus and cheeks. Clypeus: Oval shaped, widest at truncation, coarsely punctate, similar to cheeks; anterior margin projecting, convex, narrow, less than half head width at mandibles. Front or rear view. Node: Summit wide, straight, with few long setae.

Minor worker. In lateral view. Head: Red brown, side glossy with sparse short flat setae; scape red brown; funiculus lighter red brown; vertex with few long setae, underside of head without erect setae, with sparse, short, flat-lying setae. Pronotum: Red brown, lighter than mesonotum. Pronotum and mesonotum: Even convexity with few, very long setae. Metanotum: Distinct vee. Propodeum: Brown, dorsum with few scattered setae, anterior dorsum inclined upward to ridge, then shallow concavity to



Figs 16, 17. *Camponotus janforrestae* sp. nov. 16. Minor worker, head and mesosoma. Underside of head with erect setae. 17. Known distribution. Scale bar = 1 mm.

Figs 18, 19. *Camponotus mackayensis*. 18. Minor worker, head and mesosoma. Dorsum of propodeum is concave. 19. Known distribution. Scale bars = 1 mm.

widely rounded angle; declivity mostly straight; ratio dorsum/declivity about 1.5; glossy, deeply striate near spiracle. Node: Brown with few long setae, without pubescence; anterior face mostly straight; summit rounded; posterior face straight. Gaster: Brown, glossy, finely striate. Fore coxa: Mostly red brown with some yellow. Fore femur: Swollen. Tarsus: Red brown. Mid tibia: Red brown with sparse, flat-lying setae, without bristles inside. In dorsal view. Head: Sides, anterior half tapering to front; vertex flatly convex between widely rounded corners; scape sometimes with few long setae; frontal carinae diverging wide; frontal area depressed; max HW posterior to eye centre; five coarse teeth visible. Clypeus: Glossy with few long and short, scattered flat-lying setae; carina indistinct; anterior margin convex, projecting. In front or rear view. Node: Summit wide, straight with few long setae.

#### Measurements

PW 0.80-1.05 mm, HT 0.7-1.15 mm, HW 1.00-1.15 mm, HL 1.00-1.70 mm, CAR W 0.8 mm, CLY W 0.4-0.45 mm, TL 0.8-1.0 mm.

#### Remarks

Workers of this species have been found on trees as well as the ground in rainforests, mangrove and savannah woodland. All known nests have been found in dead twigs and branches.

#### *Camponotus macrocephalus* (Erichson) (FIGS 20, 21)

*Formica macrocephala* Erichson 1842: 259.

*Camponotus (Colobopsis) fector* Forel 1902: 508  
Synonym Shattuck and McArthur 1995: 121.

*Camponotus fector angustulus* Viehmeyer 1925: 145  
New Synonym.

*Colobopsis rufifrons semicarinata* Forel, 1895b: 418  
New Synonym.

*Camponotus (Colobopsis) semicarinatus* Forel 1902:  
508 Combination.

*Types examined:* *Camponotus fector*: Major and minor workers labelled "Typus from Newcastle New South Wales." Box 175 (GMNH). *Camponotus fector angustulus*: Major and minor workers labelled "Typus from Trial Bay, New South Wales" (ANIC). *Camponotus semicarinatus*: Major and minor workers labelled "Typus from Mackay, Queensland" (GMNH).

*Other material examined:* Australian Capital Territory: Blundell's Farm, 1955, TG (ANIC); Brindabella, 1933, TG (ANIC); Brindabella Ra.,

1930, TG (ANIC); Canberra Sutton Rd., 2025, TG (ANIC); Kowen, 1932, TG (ANIC); Lees Spring, 1930, TG (ANIC); Lees Spring, 1931, TG (ANIC); Uriarra, 1931, TG (ANIC); Yarralumla, 1976, BBL (ANIC), New South Wales: Braidwood Rd, 1937, TG (ANIC); Burns Bay, Lane Cove, 1959, BBL (SAMA); Ebor, 1973, BBL (ANIC); Germa, 1962, BBL (ANIC); Kiandra, 1960, EFR (ANIC); Nerriga Braidwood Nowra Rd, 1937, TG (ANIC); Newcastle, JCI (ANIC); Pine Ck State Forest, 1957, TG (ANIC); Pymble, 1956, BBL (ANIC); Pymble, 1944, JMc (ANIC); Springwood, 1965, BBL (ANIC); Tumbulgum, 1962, BBL (ANIC); Tumut, 1962, BBL (ANIC), Queensland: Brisbane, JDM (Curtin); Brisbane, 1948, RAP (ANIC); Bundaberg, 1968, JJD (ANIC); Bundaberg, JJD (ANIC); Cairns, 1975, BBL (ANIC); Cairns, 1975, BBL (ANIC); Cairns, 30 mi. N, 1966, RWT (ANIC); Giru Houghton R., 1980, RWT (ANIC); Lamington Plateau, Nuptial Flight, 1999, RE (SAMA); Missionary Bay, Hinchinbrook I., 1977, RWT (ANIC), South Australia: Littlehampton, 1995, JT (SAMA); Lucindale, Feu (SAMA), Tasmania: Asbestos Ra., 1991, BBL (SAMA); Bakers Beach, 1994, BBL (SAMA); Big River, 1991, BBL (SAMA); Bridport, 1995, BBL (SAMA); Dulverton, 1995, BBL (SAMA); Erita Flinders I., 1991, BBL (SAMA); Epping Forest, 1993, BBL (SAMA); Flinders I. Mt Sirezlecki, 1991, BBL (SAMA); Freycinet Peninsula, BBL (SAMA); Isthmus Bay, 1992, BBL (SAMA); Low Head, 5 km E, 1992, BBL (SAMA); Mt William, 1993, BBL (SAMA); North Bruny I., 1992, BBL (SAMA); Port Sorell, 4 km S, 1992, BBL (SAMA); Sassafras, 1993, BBL (SAMA); Seymour, 1994, BBL (SAMA), Victoria: Greensborough, JMc (ANIC); Loengatha, 1957, BBL (ANIC); Portland, 1958, JMc (ANIC).

#### Worker diagnosis

Mandibles in major workers smooth, with shallow foveae, rugae weak and limited to anterior region of dorsal surface of the mandible. Few long, erect setae on head and gaster, none elsewhere. In lateral view, dorsal surfaces of pronotum, mesonotum and propodeum form a continuous weakly convex surface, the posterior propodeal face mostly straight (Fig. 20).

#### Worker description

Major worker. In lateral view. Yellow brown, gaster sometimes darker, limbs, especially coxa very much lighter than mesosoma. Head: Side with no erect setae, anterior sharply truncated; posterior glossy, smooth, anterior striations extending from truncation nearly half way to eye; vertex with few long setae; underside of head without erect setae, with very sparse short, flat-lying setae. Mesosoma: Without erect setae; Pronotum and Mesonotum: Evenly convex.

Metanotum: Wide trough, spiracle well below dorsum. Propodeum: Dorsum evenly curved, angle rounded; declivity mostly straight; ratio dorsum/declivity, approximately 1; spiracle well forward of declivity, closer to coxa than dorsum, surrounded by indistinct reticulate integument, glossy, without pilosity. Node: Without setae, anterior face lower half straight, upper evenly convex; summit blunt; posterior face straight. Gaster: Glossy, indistinctly striate. Fore femur: Swollen. Mid tibia: Without erect setae, with sparse, flat-lying pubescence, without bristles inside. In dorsal view. Head: Nearly rectangular; sides straight, parallel; vertex straight, angles blunt; scape with very sparse, short, flat-lying setae. Frontal carinae mostly straight, diverging, posterior very wide. Frontal area, very small, depressed; clypeus sides bordered by sharp ridge, narrow, widest at truncation, sides nearly straight, tapering anteriorly, grossly ridged longitudinally, similar to cheeks, three fourths of clypeus anterior to truncation. Anterior head comprising clypeus, mandibles and cheeks lie on flat circular plane; max HW at eye centre; eyes oval. Clypeus: Without erect setae; carina present within striations; anterior margin narrow, projecting, evenly convex. In front or rear view. Node: Summit wide, slightly indented, without setae.

Minor worker. Head: Brownish yellow to brown, limbs and antennae more yellowish, much lighter than mesosoma; side of head, mesosoma, node yellow brown; vertex with few setae; underside of head without erect setae. Mesosoma: Glossy, microscopically reticulate, without pilosity. Pronotum: Anterior and posterior thirds straight,

centre third convex. Mesonotum: Mostly straight, slightly raised above pronotum and propodeum. Metanotum: Slight ridge; spiracle near middle of side. Propodeum: Dorsum straight to flatly convex, angle abrupt; declivity nearly straight, ratio dorsum/declivity about 1.5; spiracle situated midway between dorsum and coxa, glossy, surrounded by microscopic reticulation. Node: Without pilosity, anterior face lower half straight, convex above; summit sharp; posterior face straight. Gaster: Finely striate. Fore femur: Swollen. Mid tibia: With indistinct, sparse, short, flat-lying setae, without bristles inside. In dorsal view. Head: Sides straight, slightly tapering to front; vertex and angles form even convexity; scape with indistinct, sparse, short, flat setae; frontal carinae wide, diverging; frontal area indistinct, diamond shaped; max HW just posterior to eye centre. Clypeus: Glossy, finely reticulate, few sparse, erect, setae; carina indistinct; anterior margin, convex, wide, projecting. In front or rear view. Node: Summit wide, sometimes indented, without setae.

#### Measurements

PW 0.7-1.2 mm, HT 0.8-1.25 mm, EL 0.3-0.4 mm, HW 0.95-1.7 mm, HL 1.1-1.9 mm, CAR W 0.5-0.8 mm, CLY W 0.5-0.6 mm, TL 0.95-1.0 mm, NW 0.35-0.65 mm.

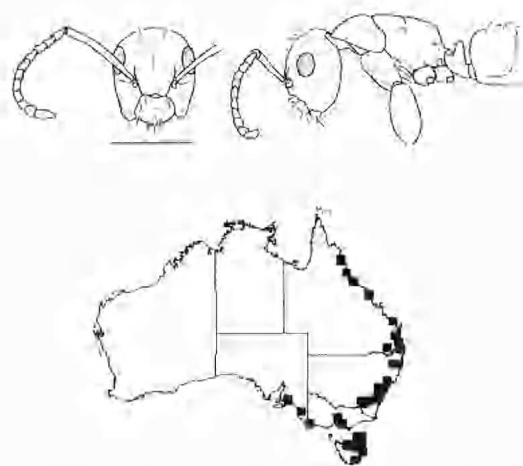
#### Remarks

Forel (1902) distinguished *semicarinus* from *macrocephalus* (as *fictor*) by differences in the shape of the head, propodeum and petiolar node and in having the sculpturing on the truncated portion of the clypeus "more clearly lengthwise and not wrinkled-reticulate as in the case of *semicarinus*". Viehmeier (1925) described the subspecies *augustus* as having "head of the major worker noticeably narrower than in the type, the truncate surface of the anterior head less sharply delineated and less concave, and the longitudinal grooves of the head and clypeus much stronger". However, the currently available material shows considerable variation in all of these characters and we can find no justification for recognising the subspecies separately from *C. macrocephalus*. For separation from the closely related *C. howensis*, see **Remarks** under that species.

*Camponotus macrocephalus* is generally found nesting in branches of trees and shrubs in eastern Australia.

#### *Camponotus sanguinifrons* Viehmeier (FIGS 2, 22, 23)

*Camponotus (Colobopsis) sanguinifrons* Viehmeier 1925: 143.



Figs. 20, 21. *Camponotus macrocephalus*, 20, Minor worker, head and mesosoma. Dorsum of mesosoma is mostly straight. 21, Known distribution of *C. macrocephalus*. Scale bar = 1 mm.

*Type examined:* Major and minor workers labelled "Typus," from Trial Bay, New South Wales, Box 165/3 (ZMB).

*Other material examined:* New South Wales: Leppington, 1966, EK (ANIC); Mt Warning, 1964, BBL (ANIC); Tumut, 1962, BBL (ANIC); Leslie Dam, 1997, AJM & RE (SAMA); Tumut, 1962, BBL (ANIC). Northern Territory: Kakadu NP, 1992, BBL (SAMA). Queensland: Mackay, 1972, BBL (ANIC); Mingela, 1 km E, 1997, BBL (SAMA); Mt Tozer, 3 km ENE, 1986, JCC (ANIC); Mackay, GT (ANIC).

#### *Worker diagnosis*

Minor worker with a few long, erect setae on underside of head, few more on gaster and none elsewhere. Dorsal surface of propodeum about three times as long as declivity surface. Major differs greatly from minor. In major worker, anterior regions of head clothed in plentiful short, clavate setae (Fig. 2) particularly on and near truncation; absent from posterior regions; few long setae on underside of head, coxa and gaster (Fig. 22).

#### *Worker description*

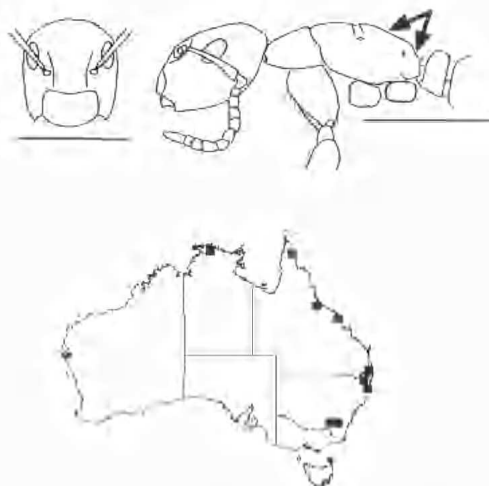
Major worker. In lateral view. Head: Posterior dark brown, anterior red; posterior without pilosity, anterior with dense, fine, short, white, clavate setae (Fig. 2) especially on cheeks and clypeus; antennae red brown; underside of head with few long setae. Mesosoma and node: Dark brown without pilosity, glossy, finely striate. Pronotum: Anterior quarter straight, next quarter rounded, then flatly convex. Posterior half of pronotum, mesonotum, metanotum and dorsum of propodeum form uninterrupted gentle curve. Metanotum: Wide, marked by two transverse sutures. Propodeum: Angle about 150°; declivity mostly straight; ratio dorsum/declivity about 1.5. Node: Anterior face lower half straight, otherwise convex; summit rounded; posterior face straight, inclined forward. Limbs: Lighter coloured than mesosoma, fore femur swollen. Mid tibia: With short, sparse, flat-lying setae, without bristles inside. In dorsal view. Head: Sides straight, parallel; vertex mostly straight, scape with indistinct, flat, short, sparse setae; frontal carinae wide, short, straight, diverging behind; anterior head truncate, clypeus mandibles and cheeks forming flat circular area coarsely punctate with few coarse longitudinal striations and central keel; plentiful short, erect, stubble-like, clavate setae; clypeus lateral margins widest at centre of circular area; frontal area extended laterally at truncation. Clypeus: Anterior margin well posterior to mandible insertions, straight, short. In front or rear view. Node: Summit flat, wide.

Minor worker. In lateral view. Dark brown, limbs,

anterior head and antennae a little lighter coloured. Head: Side glossy without pilosity, finely striate; vertex with a few long setae, underside of head without pilosity. Mesosoma: Without pilosity, finely striate, reticulate. Pronotum: Anterior half convex, posterior half straighter. Mesonotum: Anterior and posterior sixths inclined, centre flatly convex. Metanotum: Shallow trough, spiracle well below dorsum. Propodeum: Dorsum anterior quarter inclined upward, otherwise straight and sloping downward; angle rounded 135°; declivity upper half straight, lower half strongly concave; ratio dorsum/declivity approximately 3; spiracle situated well forward of declivity and midway between dorsum and coxa. Node: Without pilosity, anterior and posterior faces parallel; anterior face short, straight; summit sloping upward rounded; posterior face straight, longer than anterior. Gaster: Finely striate; scattered upstanding setae without visible pubescence. Fore femur: Swollen. Mid tibia: Sparse, fine, flat-lying setae, without bristles inside. In dorsal view. Head: Sides straight, tapering slightly to front; vertex flat with rounded corners; scape with indistinct, sparse, fine, flat-lying setae; frontal carinae short, wide; frontal area indistinct; max HW near eye centre. Clypeus and cheeks: Finely reticulate with few setae; carina distinct posteriorly; anterior margin projecting, evenly convex, wide. In front or rear view. Node: Summit straight, without pilosity.

#### *Measurements*

PW 0.45 – 0.55 mm. HT 0.55 – 0.65 mm. EL 0.20 – 0.22 mm. HW 0.75 – 1.10 mm. HL 0.85 – 1.40 mm.



Figs 22–23. *Camponotus saugainifrons*. 22. Minor worker, head and mesosoma. Dorsum of propodeum is longer than declivity. 23. Known distribution. Scale bars = 1 mm.



CAR W 0.4 mm, CLY W 0.38 mm, TL 0.72 -0.75 mm, NW 0.2 - 0.25 mm.

### Remarks

In this species the major workers and queens possess plentiful distinctive short, clavate setae (Fig. 2) on the anterior head. Setae on the anterior head of minor workers are sparse, longer, uniform diameter and not clavate. (Clavate setae resemble a forest of miniature matches with enlarged extremities.) Such clavate setae are uncommon in *Camponotus* although Donisthorpe (1948) refers to similar clavate setae in *Camponotus (Colobopsis) excavatus* from Maffin, West Irian.

AJM and RE collected an alate female at Leslie Dam, Eatonsville, NSW at 10 p.m. on 29 Nov. 1997. This suggests that nuptial flights of this species might occur near the last week in November.

*Camponotus vitreus* (Smith)  
(FIGS 24, 25)

*Formica vitrea* Smith 1860: 94.

*Prenolepsis adlerzii* Forel 1886: 209; Forel 1895: 458 Synonym.

*Camponotus (Colobopsis) vitreus*: Emery 1893: 225 Combination.

*Camponotus vitreus*: Forel 1895a: 455.

*Camponotus vitreus*: Viehmeyer 1916: 160.

*Camponotus vitreus*: Emery 1925: 148.

*Camponotus vitreus*: Karavaiev 1933: 319.

*Material examined*: Northern Territory: Darwin, 10 mile Jungle, WCC (SAMA); Darwin, Holmes Jungle, 1997, AJM (SAMA); Howard Springs, AS (SAMA); Howard Springs, 1951, WLB (ANIC); Litchfield, 1994, BBL (SAMA); Mt Brockman, Radon Ck, 1979, GBM (ANIC); Mt Gilruth, NE Gorge, 1979, GBM (ANIC). Queensland: Bamagan, 1983, JS (ANIC); Brisbane, JDM (Curtin); Cairns, 1970, DPIQ (DPIQ); Cairns, 1996, JBS (ANIC); Cairns, 1914, WMW (SAMA); Cairns, 20 km N, Cook Hwy, 1975, BBL (ANIC); Cairns, Lake Placid, 1975, BBL (ANIC); Cairns, Parkland, 1975, BBL (ANIC); Cape Tribulation, 1980, GBM (ANIC); Cape Tribulation, 2.5 km W, 1982, GBM (ANIC); Cardwell, 10 km NW, 1976, PJM (ANIC); Clump Point, 6 km W, 1971, RWT, JEF (ANIC); Cooktown Bot. Gdn., 1990, BBL (ANIC); Daintree, Cooper Ck, 1971, RWT, JEF (ANIC); Deeral Landing, 1975, BBL (ANIC); Edge Hill, 1971, BBL (ANIC); Ety Bay, 1980, GBM (ANIC); Goodna, 1956, BBL (ANIC); Hayman I., 1996, RSB (ANIC); Heathlands, 12 km SSE, 1992, IDN (ANIC); Hope Vale Mission, 15 km W by N, 1981, JEF (ANIC); Ingham, 1975, BBL (ANIC); Iron Ra., 1971, RWT,

JEF (ANIC); Kuranda, 1914, AML, WMW (ANIC); Kuranda, 1919, FPD (SAMA); Kuranda, 1914, WMW (SAMA); Lake Eacham, 1972, RWT (ANIC); Lakeland, Laura, 1980, GBM (ANIC); Mackay, Tur (ANIC); Magnetic I., 1981, BBL (ANIC); Magnetic I., GFH (ANIC); Mareeba, 1937, TG (ANIC); Mareeba Claehesey R., 1937, TG (ANIC); Mission Beach, 1962, RWT (ANIC); Missionary Bay, Hinchinbrook I., 1977, RWT (ANIC); Mossman Gorge, 1966, RWT (ANIC); Mt Baird, 3.5 km SW by S, 1981, IDN (ANIC); Mt Cook NP, 1980, DHC (ANIC); Mt Coot-tha, 1961, BBL (ANIC); Mt Tozer, 3 km ENE, 1986, TAW (ANIC); Mt Webb, 1981, IDN (ANIC); Packers Ck nr Portland Roads, 1985, GBM, DJC (ANIC); Palm I., GFH (ANIC); Palmerstone NP, 1969, RWT (ANIC); Rounded Hill, 1 mile N, 1981, JEF (ANIC); Silver Plains, Massey Ck, 1979, BJW (ANIC); Somerset, 1976, EC (ANIC); Townsville, 1902, FPD (SAMA); Townsville, 1974, JAh (ANIC); Yarrabah Aboriginal Community, 1988, RWT (ANIC).

### Worker diagnosis

Whole ant clothed in plentiful long erect setae except absent on most of underside of head. In lateral view, metanotal groove is depressed, mesonotum and propodeum form high, arched convexities (Fig. 24).

### Worker description

Major worker. In lateral view. Dark red brown, limbs and funiculus lighter coloured, gaster darker. Head: Truncation rounded 135°; side glossy with sparse extremely short, adpressed setae, without erect setae; few long and short, erect setae on vertex and posterior head, absent on anterior head; underside of head without erect setae. Pronotum and mesonotum: Uniform semicircle scarcely marked by pro-mesonotal suture, plentiful long and short, erect setae and sparse flat-lying setae. Metanotum: Trough with distinct sloping sides; spiracle directed upward, aperture level with dorsum. Propodeum: Humped high, also forming semicircle, slightly flattened on top; angle near right angle, rounded; declivity straight above, concave below; ratio dorsum/declivity about 1.5; spiracle situated midway between coxa and dorsum, directed backward, surrounded by glossy surface with very sparse, short, fine setae. Node: Short longitudinally, few long setae, without pubescence, lower and upper halves of anterior face straight, separated by rounded 135° angle; summit sharp; posterior face mostly straight. Gaster: Glossy. Fore femur: Swollen. Mid tibia: With plentiful sub-erect setae, without bristles inside. In dorsal view. Head: Sides weakly convex, tapering to front; vertex straight; scape with plentiful distinct setae raised 45°; frontal carinae wider than half HW, more or less continuous with lateral margins of

clypeus; frontal area elongated, diamond shaped, depressed; max HW at eye centre; five teeth. Clypeus slightly raised above cheeks and separated on sides by ridge; anterior third of clypeus, surrounding cheeks and mandibles form a truncated plane separated from surroundings by rounded angle without striations; sides of clypeus narrow, widest at truncation then tapering to front; glossy without pubescence, with one or two erect setae; without carina; anterior margin very narrow, projecting, convex. Front or rear view. Node: Summit straight sometimes widely indented, with plentiful, short, fine setae.

Minor worker. Lateral view. Dark red brown, limbs and funiculus lighter. Head: Side glossy with sparse, extremely short, adpressed setae; vertex with few long and short fine setae; underside of head without erect setae. Mesosoma: Similar to major worker except aperture of metanotal spiracle placed above dorsum. Node: Short longitudinally with few long setae, lacking pubescence; lower and upper halves of anterior face straight, separated by rounded 135° angle; summit sharp but not as sharp as major; posterior face mostly straight. Gaster: Slightly darker than head, glossy. Fore femur: Little lighter coloured than coxa, swollen. Mid tibia: Plentiful sub-erect, long, setae, lacking bristles on inside. Dorsal view. Head: Sides nearly straight, tapering to front; vertex

convex, flattened at centre; scape with plentiful distinct setae raised 45°; frontal carinae wider than half HW; frontal area indistinct triangle; max HW at eye centre. Clypeus: Without truncation, finely punctate, anterior margin convex, projecting, very wide; sides of clypeus straight; glossy, without pubescence with few fine, erect setae; with indistinct carina. Front or rear view. Node: Summit wide, straight, with plentiful; short, fine setae, sometimes indented.

#### Measurements

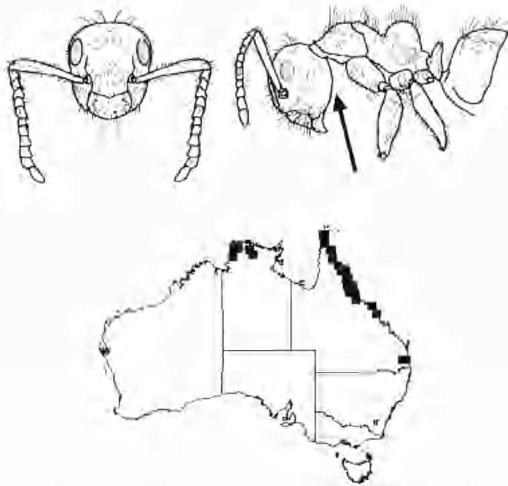
HW 0.85-1.55 mm, HL 0.85-1.55 mm, PW 0.60-1.05 mm, HT 0.65-1.20 mm, CARW 0.45-0.85 mm, TL 0.80-0.95 mm.

#### Remarks

*Camponotus vitreus* is confined to the tropics and is often seen foraging on tree trunks and on the ground in rain forest. Smith (1860) described this species from specimens collected by A. R. Wallace, at "Baebian, running in numbers up and down tree trunks, probably in search of Aphides" (the locality is now Batjan, Molucca Islands, Indonesia). Viehmeyer (1916) noted that in Singapore, *C. vitreus* "nests in thin bamboo, in rotten wood and in hollow branches of *Mangifera*. Females frequently on the lamp. One such caught female had raised 6 sterile females in a plaster nest". WCC collected specimens of *C. vitreus* from "a hole in a tree" near Darwin. Staff of the Quarantine Service, Department of Primary Industries, Queensland collected specimens of *C. vitreus* (vial Hy77) from a wooden window sill at Cairns, Qld on 5 June 1970. No attempt has been made here to determine the distribution of *C. vitreus* outside Australia. We have been unable to examine type material of *C. vitreus* and the concept accepted here is based on Smith's original description.

#### Acknowledgments

This work has been made possible by grants from Australian Biological Resources Study and the Sir Mark Mitchell Trust, and the support of the South Australian Museum and CSIRO Entomology. Thanks are due to the referees A. Andersen, A. Austin and B. Heterick for their helpful comments, A. Vincent for the finest of the drawings, M. Anthony and N. Barnett for library assistance and E. G. Matthews and S. Barker for their encouragement.



Figs 24, 25. *Camponotus vitreus*. 24. Minor worker, head and mesosoma. Underside of head lacks erect setae. 25. Known distribution of *C. vitreus*. Scale bar = 1 mm.

## References

- BINGHAM, C. T. (1903) "The Fauna of British India including Ceylon and Burma. Hymenoptera, Ants and Cookoo Wasps" (Taylor & Francis, London).
- BOLTON, B. (1995) "A new general catalogue of the ants of the world" (Harvard University Press, Cambridge, Mass.).
- BROWN, W. L. (1972) A comparison of the Hylean and Congo-West African rain forest ant faunas pp. 161-185 *In* Meggers, B. J., Ayensu E. S. & Duckworth W. D. (Eds) "Tropical forest ecosystems in Africa and South America: a comparative review" (Smithsonian Institution Press, Washington, DC).
- DONISTHORPE, H. (1948) A new species of *Colobopsis* (Hym., Formicidae) from New Guinea with a few notes on the subgenus. *Entomol. Mon. Mag.* **84**, 121-122.
- EMERY, C. (1889) Viaggio di Leonardo Fea in Birmania e regioni vicine. 20. Formiche di Birmania e del Tenasserim raccolte da Leonardo Fea (1885-1887). *Ann. Mus. Civ. Stor. Nat.* **7**, 485-520.
- \_\_\_\_\_ (1893) Voyage de MM. Bedot et Pietet dans l'Archipel Malais. Formicides de l'Archipel Malais. *Rev. Suisse Zool.* **1**, 187-229.
- \_\_\_\_\_ (1896) Saggio di un catalogo dei generi *Camponotus*, *Polyrhachis* e affini. *Mem. R. Accad. Sci. Ist. Bologna* **5**, 363-382.
- \_\_\_\_\_ (1914) Les Fourmis de la Nouvelle-Caledonie et des îles Loyalty pp. 393-437 *In* Sarasin, F. & Roux, J. (Eds) "Nova Caledonie, Recherches scientifiques en Nouvelle-Caledonie et aux Îles Loyalty. A. Zoology. Vol 1" (C. W. Kreidel's Verlag, Wiesbaden).
- \_\_\_\_\_ (1925) Hymenoptera. Family Formicidae, subfamily Formicinae *In* Wytzman P. (Ed.) "Genera Insectorum" pp. 138-150, Fasc. **183**, (Louis Desmet-Verteneuil, Brussels).
- ERICSSON, W. B. (1842) Beitrag zur Insecten-Fauna von Vandiemensland, mit besonderer Berücksichtigung der geographischen Verbreitung der Insecten. *Arch. Naturg.* **8**, 83-287.
- FOREL, A. (1886) Etudes myrmécologiques en 1886. *Ann. Soc. R. Zool. Belg.* **30**, 131-215.
- \_\_\_\_\_ (1894) Quelques Fourmis de Madagascar (récoltées par M. W. W. Smith), de Nouvelle Zelande (récoltées par M. Sommer) de Queensland (Australie) récoltées par M. Wiederkehr, et de Perth (Australie occidentale) récoltées par M. Chase. *Ann. Soc. Entomol. Belg.* **38**, 226-237.
- \_\_\_\_\_ (1895a) Les Formicides de l'Empire des Indes et de Ceylan. Part 5. Adjonction aus Camponotinae. *J. Bombay Nat. Hist. Soc.* **9**, 453-472.
- \_\_\_\_\_ (1895b) Nouvelles Fourmis d'Australie, récoltées à The Ridge, Mackay, Queensland par M. Gilbert Turner. *Ann. Soc. Entomol. Belg.* **39**, 417-428.
- \_\_\_\_\_ (1902) Fourmis nouvelles d'Australie. *Rev. Suisse Zool.* **10**, 405-548.
- \_\_\_\_\_ (1912) Formicides Neotropiques. Part 6. 5me sous-famille *Camponotinae* Forel. *Mem. Soc. Entomol. Belg.* **20**, 59-92.
- \_\_\_\_\_ (1913) Fourmis de Tasmanie et d'Australie récoltées par M. M. Leu, Froggatt etc. *Bull. Soc. Vaud. Sci. Nat.* **49**, 173-196.
- \_\_\_\_\_ (1914) Le Genre *Camponotus* Mayr et les genres voisins. *Rev. Suisse Zool.* **22**, 257-276.
- HOFFMANN, B. D., GRIFFITHS, A. D. & ANDERSEN, A. N. (2000) Responses of ant communities to dry sulfur depositions from mining emissions in semi-arid tropical Australia, with implications for the use of functional groups. *Aust. Ecol.* **25**, 653-663.
- KARAVAYEV, V. (1933) Ameisen aus dem Indo-Australischen Gebiet. 7. *Konowia* **11**, 305-320.
- MAYR, G. (1861). "Die Europäischen Formiciden. (Ameisen)." (Carl Gerolds Sohn, Vienna).
- SHAPPELLE, S. O. (1999) "Australian Ants. Their Biology and Identification. Monographs on Invertebrate Taxonomy Vol. 3" (CSIRO Publishing, Collingwood).
- \_\_\_\_\_ & McARTHUR, A. J. (1995) Generic placement of Australian ants described by W. F. Ericsson (Hymenoptera: Formicidae). *J. Aust. Entomol. Soc.* **34**, 121-123.
- SMITH, F. (1860) Catalogue of hymenopterous insects collected by Mr A. R. Wallace in the islands of Bachian, Kaisai, Amboyna, Gilolo and at Dory in New Guinea. *J. Linn. Soc. Lond. Zool.* **5**, 93-143.
- SPINOLA, M. (1808) "Insectorum Liguria species novae aut rariores" (Genuaca).
- VIHMEYER, H. (1916) Ameisen von Singapore, Beobachtet und gesammelt von H. Overbeck. *Arch. Naturgesch.* **81**, 108-168.
- \_\_\_\_\_ (1925) Formiciden der australischen Faunenregion (Schluss). *Entomol. Mitt.* **14**, 139-149.
- WHEELER, W. M. (1904) The American ants of the subgenus *Colobopsis*. I Historical notes on the Taxonomy and Habits of *Colobopsis*. *Bull. Am. Mus. Nat. Hist.* **20**, 139-158.
- \_\_\_\_\_ (1927) The ants of Lord Howe Island and Norfolk Island. *Proc. Am. Acad. Arts Sci.* **62**, 121-153.
- \_\_\_\_\_ (1934) Contributions to the fauna of Rottnest Island, Western Australia No. IX. The ants. *J. R. Soc. West Aust.* **20**, 137-163.